Inequalities in One Triangle

You will recognize and apply properties of inequalities of the measures of angles in a triangle and the relationship between the angles and sides of a triangle

Comparison Property

$$a \div b$$

$$a > b \qquad a = b \qquad a < b$$

Transitive Property

$$\text{If } a < b \text{ and } b < c \qquad a < c$$

3 + 4 = 7

$$3 < 7$$

$$4 < 7$$

x + y = z

$$x < z$$

$$y < z$$

Exterior Angle Inequality Theorem
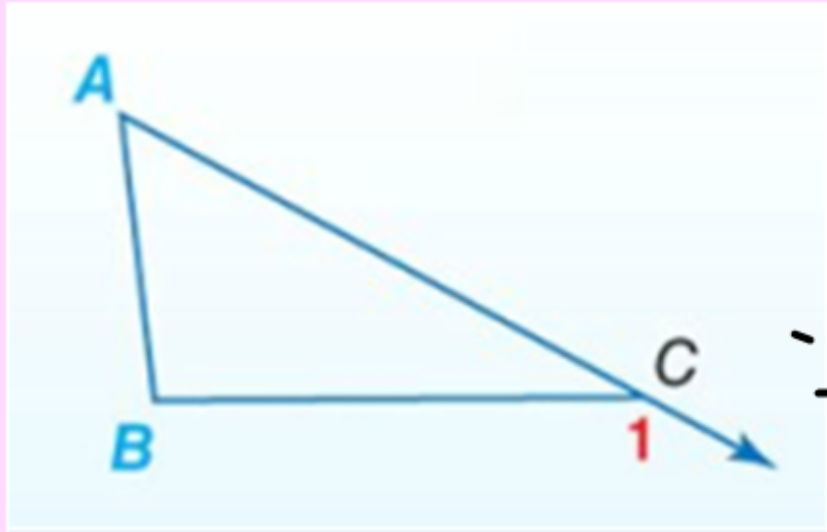
$$m \angle A + m \angle B = m \angle 1$$
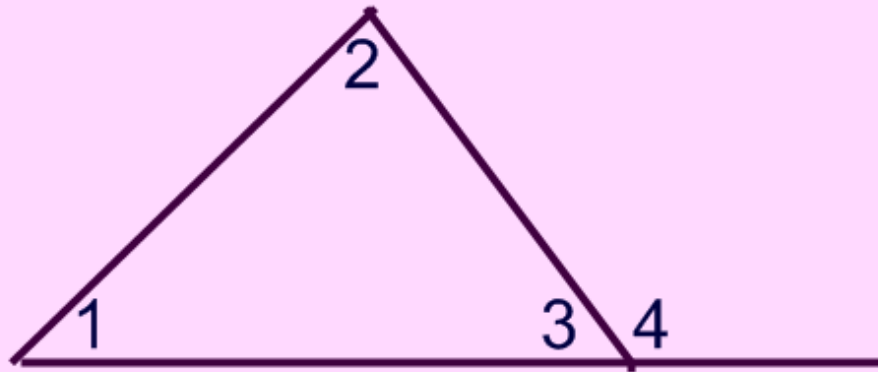
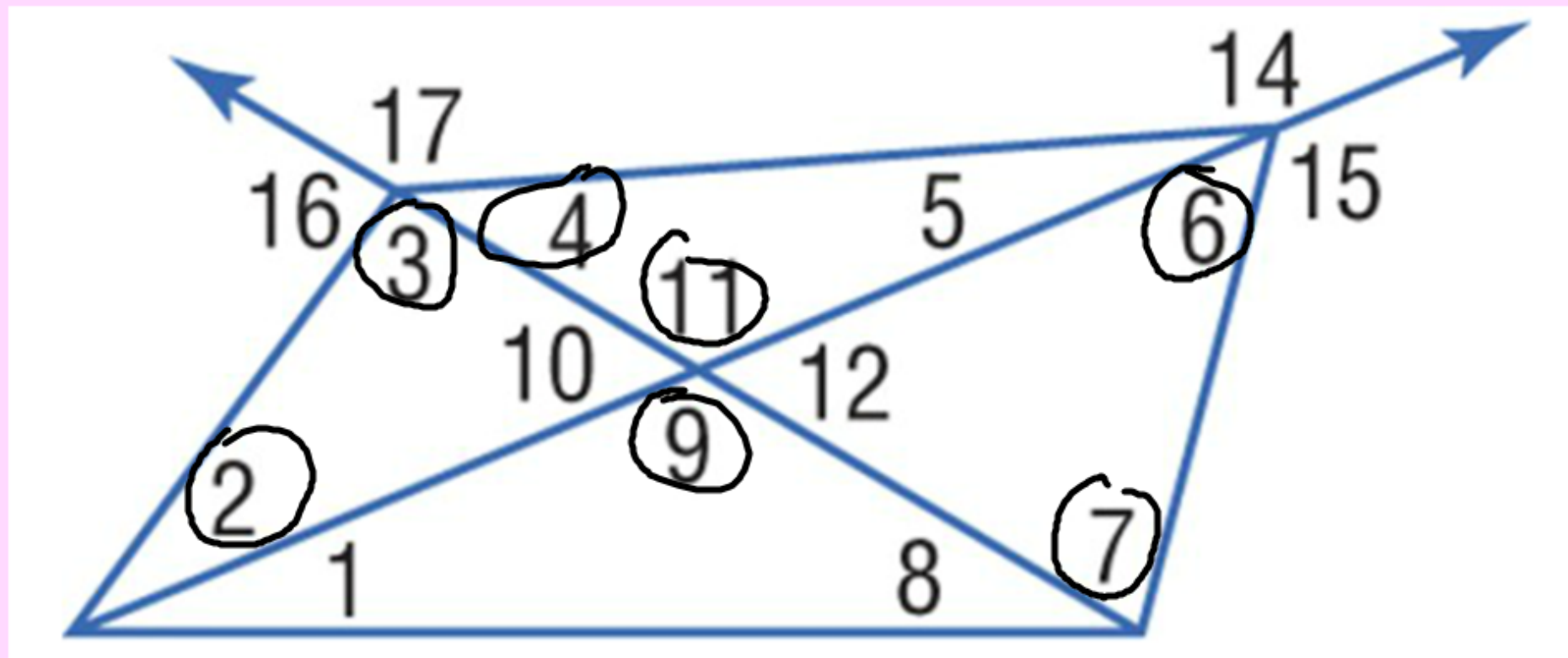$$m \angle A < m \angle 1$$

$$m \angle B < m \angle 1$$

Which angles are greater than $\angle 2$? $\angle 4$

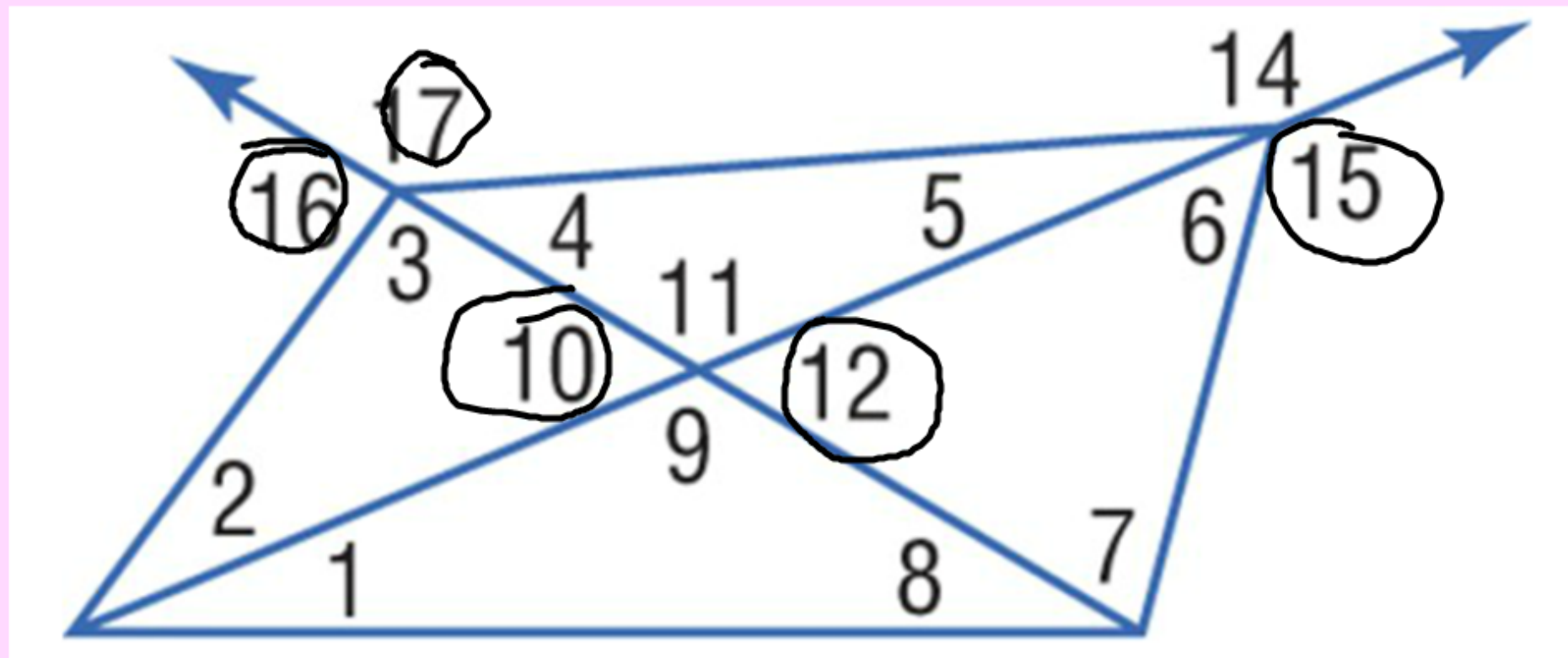Which angles are less than $\angle 4$? $\angle 1 + \angle 2$

* **greater than:** look for an exterior angle
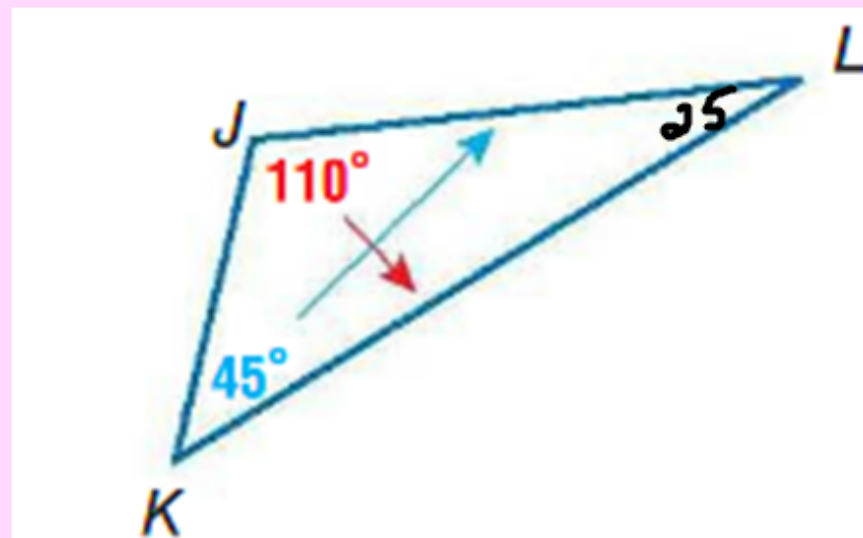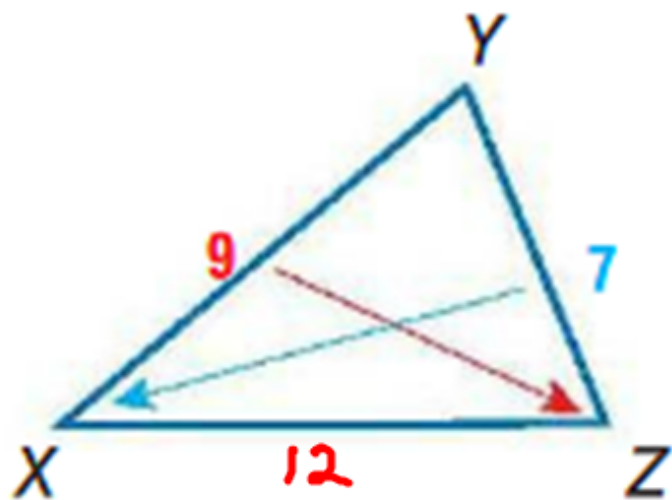 **less than:** look for remote interior angles

A. Use the Exterior Angle Inequality Theorem to list all angles whose measures are less than $m\angle 14$.

B. Use the Exterior Angle Inequality Theorem to list all angles whose measures are greater than $m\angle 5$.

Angle-Side Relationships

List the sides and angles in order from smallest to largest.

$$\overline{YZ}, \ \overline{XY}, \ \overline{XZ}$$

$$\angle X, \ \angle Z, \ \angle Y$$

$$\angle L, \ \angle K, \ \angle J$$

$$\overline{JK}, \ \overline{JL}, \ \overline{LK}$$

Shortest side ⟵opp→ smallest angle

longest side ⟵ opposite → largest angle

List the angles ↗and sides **of ΔABC in order from smallest to largest.**

Sides: $\overline{AB}$, $\overline{BC}$, $\overline{AC}$

∠'s: ∠C, ∠A, ∠B

A

11.1

15.7

B

14.3

C
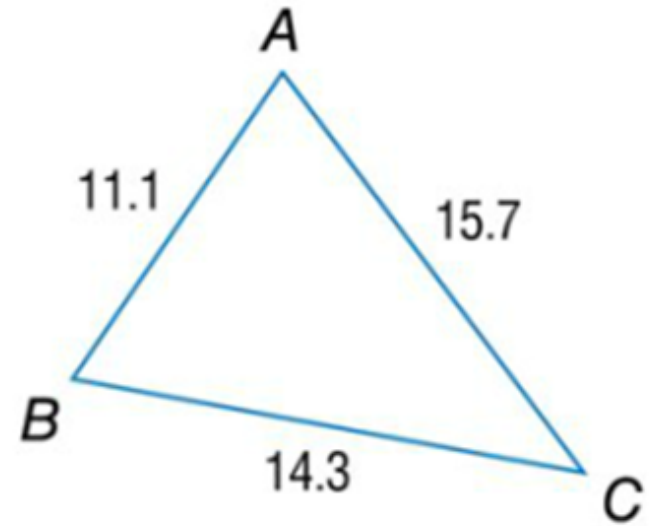
List the sides of $\triangle ABC$ in order from shortest to longest.

and angles

Angles: $\angle B, \angle C, \angle A$

Sides: $\overline{AC}, \overline{AB}, \overline{BC}$